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ARCHIVES OF PEDIATRICS

A MONTHLY DEVOTED TO THE

DISEASES OF INFANTS AND CHILDREN

JOHN FITCH LANDON, M.D., Editor

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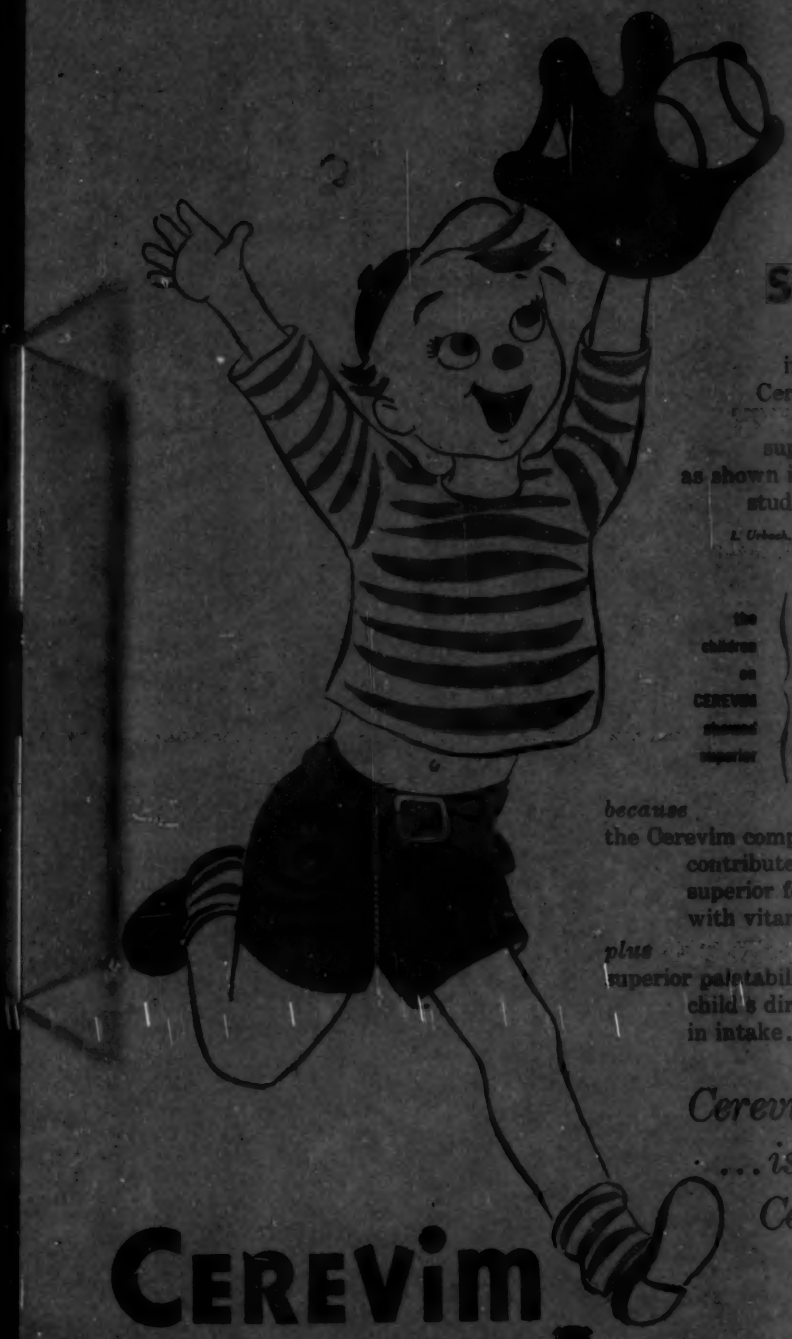

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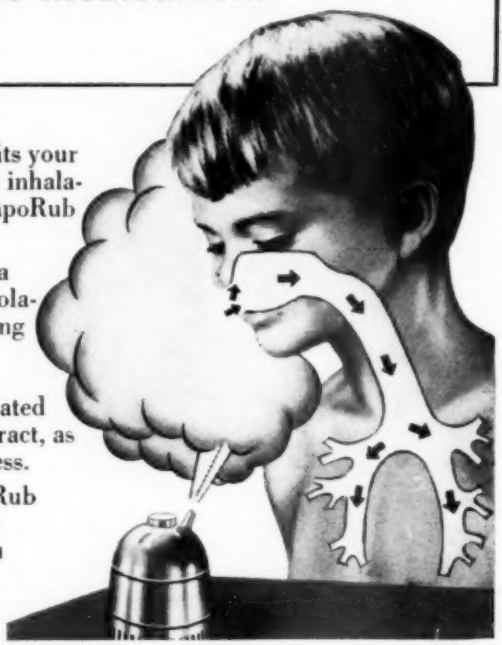

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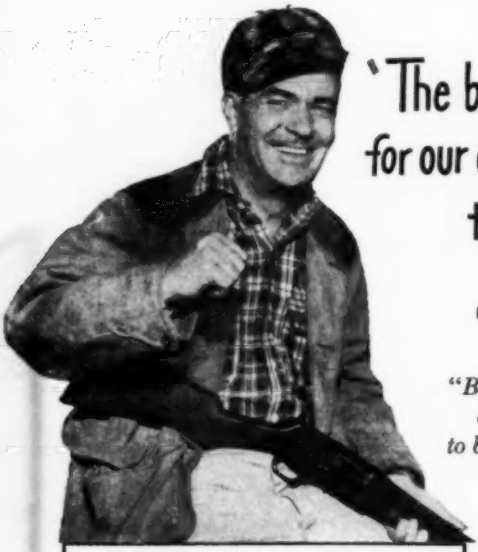

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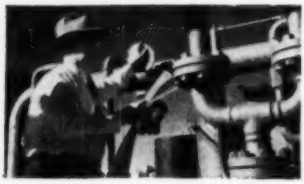

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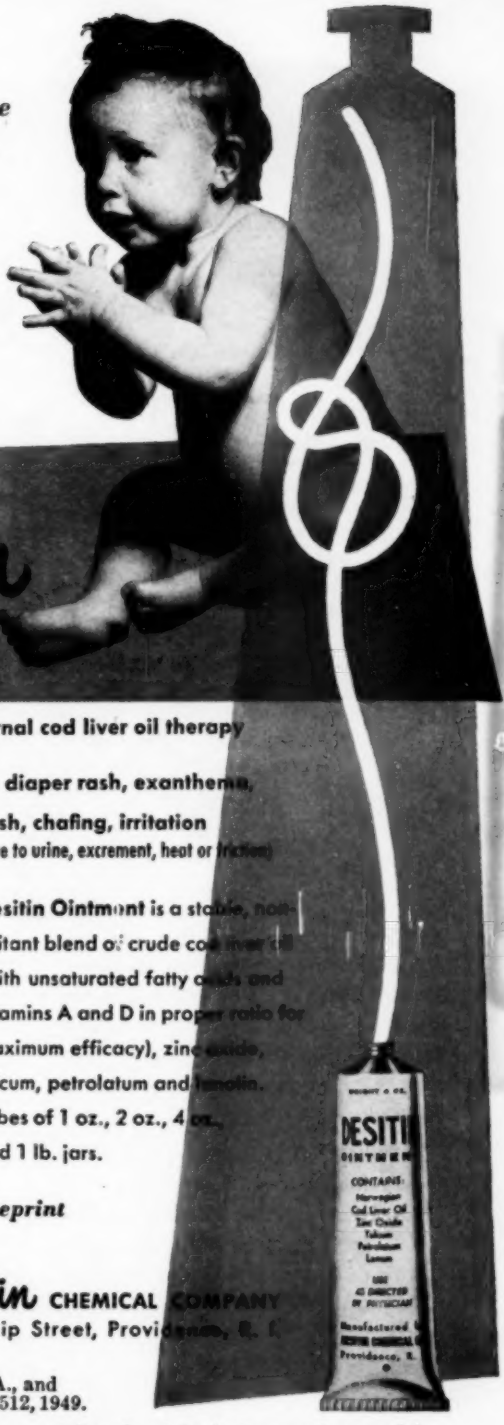

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1. Behrman, H. T., Combes, F. C., Bobroff, A., and Leviticus, R.: Industrial Med. & Surg. 18:512, 1949.

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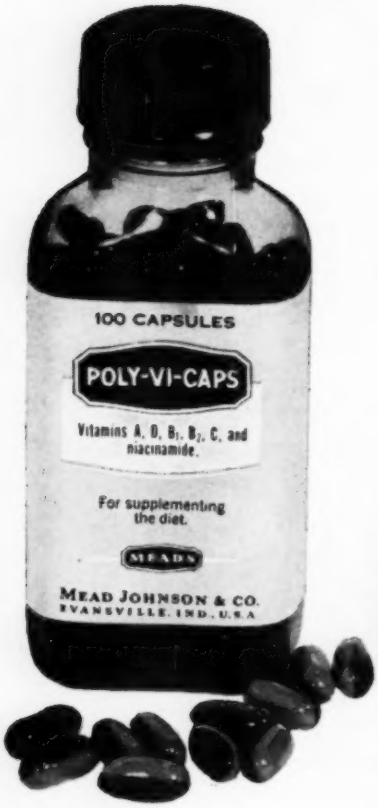

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1. Stoll, Norman R.: Jrl. of Parasitology 33:1 No. 1 (Feb.) 1947.

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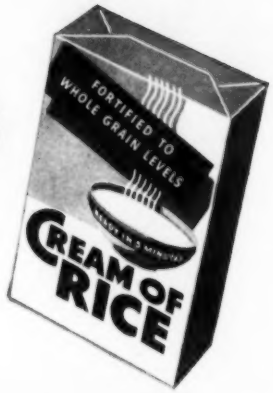

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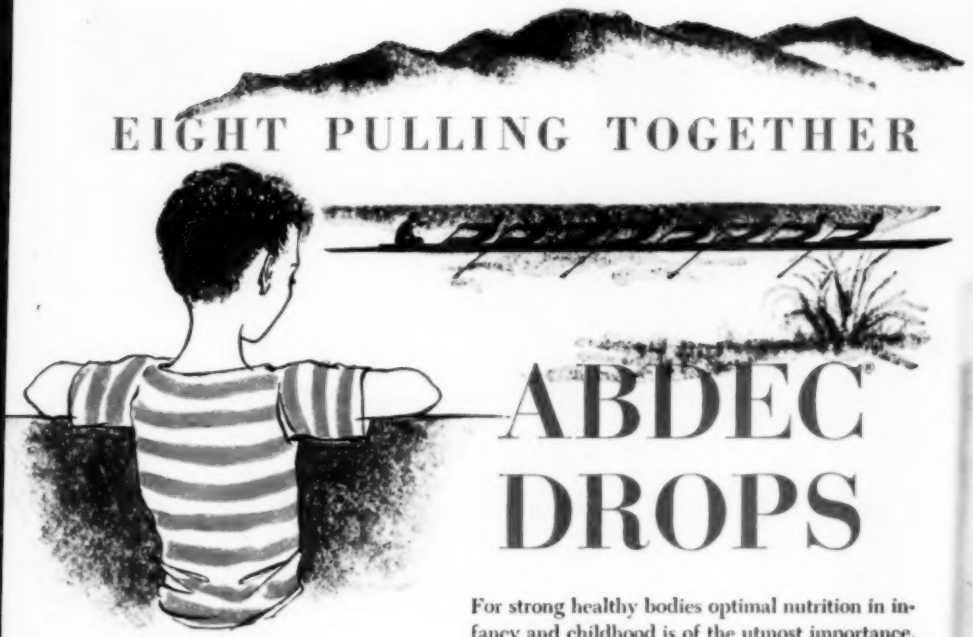

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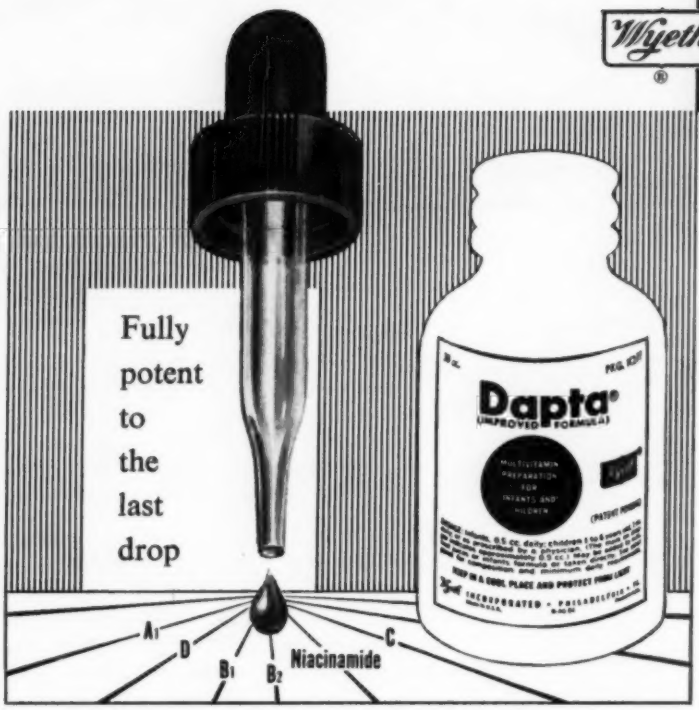

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COMPLETE TRANSPOSITION OF THE GREAT VESSELS WITH PATENT DUCTUS ARTERIOSUS AND PATENT FORAMEN OVALE

REPORT OF CASE

EUGENE H. EBEL, M.D.*

AND

C. P. LYNXWILER, M.D.**

St. Louis.

Until 1938 little was known concerning complete transposition of the aorta and pulmonary artery. Therefore, the diagnosis was seldom made before death. In 1938 Taussig[1] clearly described the clinical features of this condition and it is now recognized as a relatively common cyanotic congenital cardiac abnormality. Because of more modern methods for diagnosis of congenital heart disease, and because of the increasingly greater understanding of the signs and symptoms of this condition in terms of physiology of the circulation, transposition of the great vessels can usually be diagnosed before death.

The diagnosis of complete transposition of the great vessels is no longer merely of academic interest. Cases successfully treated surgically are now appearing in the literature. The principles underlying the various methods of surgical treatment as well as the dynamics of the circulation in the case presented are briefly reviewed in the discussion following the case report.

*Resident in Pediatrics, St. Louis University School of Medicine and St. Mary's Group of Hospitals, St. Louis, Mo.

**Director Section Pediatric Cardiology and member of the Cardiovascular Unit, St. Louis University School of Medicine and the St. Mary's Group of Hospitals, St. Louis, Mo.

CASE REPORT

Case B. D. A six pound female infant was born without incident on January 20, 1950. The pregnancy had been uneventful, although the mother had two previous pregnancies terminated by miscarriage.

From birth the infant was moderately cyanotic which became intense when she cried or was left out of oxygen for any period of time. Physical examination shortly after birth revealed a cyanotic female infant otherwise appearing in good condition. The nail beds were blue. The respiratory rate was 40 per minute; the heart rate 160 per minute. A grade II systolic murmur was heard over the entire precordium but was heard loudest at the apex. The breath sounds were normal; no râles were heard on auscultation of the chest. The liver edge was palpated 4 cms. below the costal margin but did not pulsate. The spleen could not be felt. Neurological examination was negative. Strong femoral pulsations were felt bilaterally.

A chest plate taken on January 21, 1950 (Fig. 1) revealed no cardiac enlargement but absence of the pulmonary conus. The aortic knob appeared to be right of the sternum. Laboratory work at this time revealed a white blood cell count of 16, 700 with an essentially normal differential. The red blood cell count was 4,911,000 with 110 per cent hemoglobin and an hematocrit of 55 mm. The coagulation time was 2 minutes. The urine was normal, except for a trace of albumin. The blood serology was negative.

On January 23 the electrocardiogram showed a right axis deviation. Fluroscopic examination on January 25 revealed the shadow cast by the great vessels was wider in the left anterior oblique view than in the anterior-posterior view. The diagnostic impression at this time was transposition of the great vessels but tetralogy of Fallot could not definitely be ruled out.

In the ensuing two weeks the infant did fairly well except for mild vomiting and occasionally refusal to nurse. Tube feedings controlled these problems. On January 24 she was left out of oxygen for 1½ hours; thereafter, oxygen was discontinued for increasingly longer periods until it was discontinued altogether on January 28.

On January 30, the tenth day of life, the chest plate revealed

no increase in size of the cardiac shadow as compared with the initial plate on January 21, but a definite increase in the bronchovascular markings was apparent. This was thought to be strong evidence against a diagnosis of tetralogy. The red blood cell count was now 4,550,000 with 98 per cent hemoglobin. A circulation time was attempted but no definite results were obtained. The murmur was now more intense and could be heard in the interscapular region posteriorly.

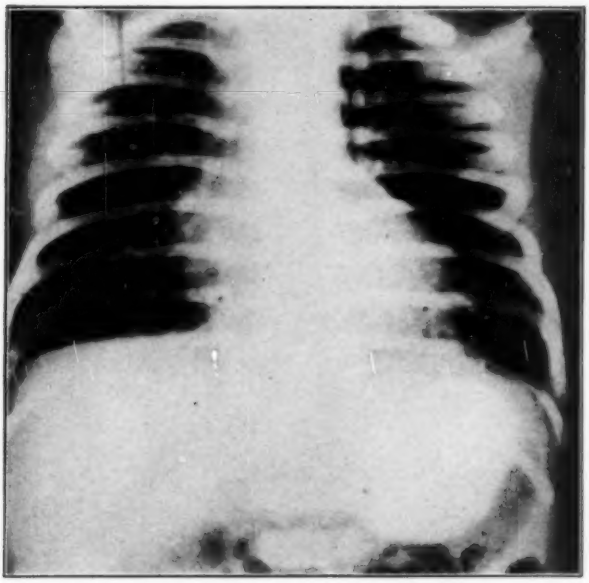

Fig. 1. Anterior-posterior x-ray of chest shows heart normal in size and absence of the pulmonary conus.

When the infant's condition would permit, angiocardiography was to be attempted to determine the feasibility of surgery. However, on the seventeenth day of life, February 6, the patient suddenly turned pale, respirations became labored, and the infant began to perspire profusely. Fine crepitant râles were heard

throughout both lung fields. The heart rate was 120 per minute. The liver edge was felt 7 cms. below the right costal margin. A chest x-ray now revealed definite cardiac enlargement and evidence of pulmonary congestion (Fig. 2). At this time a diagnosis of transposition of the great vessels appeared certain. Oxygen was restarted and the infant digitalized. Severe dyspnea and cyanosis ensued, however, and the infant expired on February 7 at the age of 18 days.

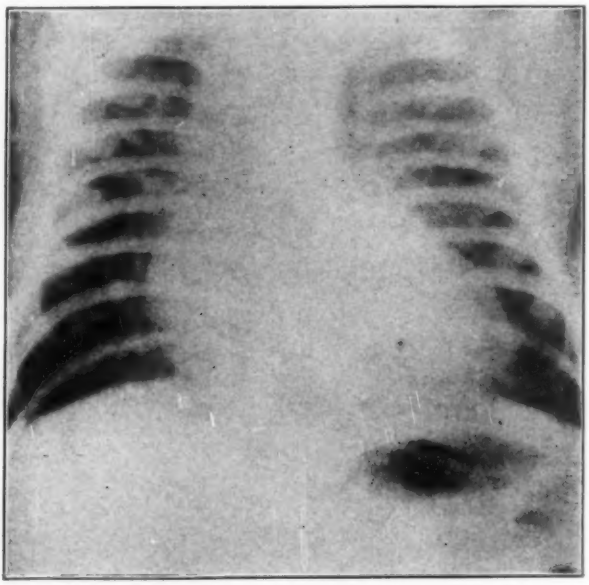

Fig. 2. Anterior-posterior x-ray of chest shortly before death. Heart is enlarged, pulmonary conus is absent and congestion of both lung fields is seen.

Autopsy Findings. A minimal amount of fluid was present in the pericardial cavity. On examination of the heart it was found that the ascending aorta arose from the right ventricle (Fig. 3) and the pulmonary artery arose from the left ventricle. Except for slight dilitation of the left ventricle, all chambers of the heart appeared of normal size. There was no muscle hypertrophy. Both

the auricular and ventricular septa were intact but the foramen ovale freely admitted a probe. The ductus arteriosus was patent. The vena cavae entered into the right auricle; the pulmonary veins entered into the left auricle.

The lungs appeared congested and atelectatic. The liver was moderately enlarged, and areas of congestion were observed in the right lobe. The gastro-intestinal tract, kidneys, and spleen appeared normal.

DISCUSSION

The points in the history and observation of this patient that suggested a diagnosis of transposition of the great vessels are:

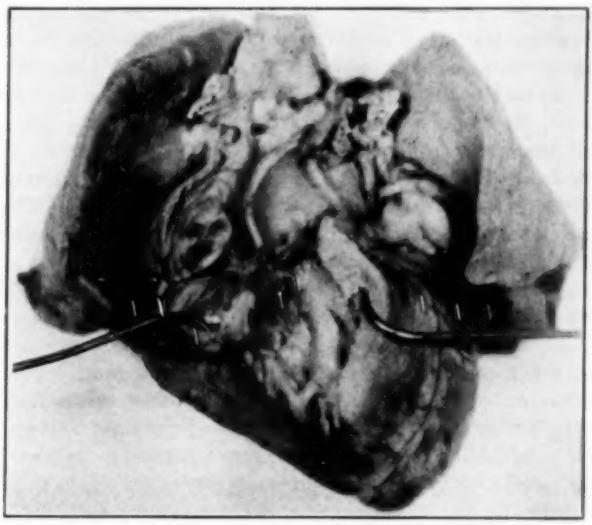

Fig. 3. Photograph of heart showing aorta arising from the right ventricle.

(1) Cyanosis dating from birth. (2) Progressive cardiac enlargement. (3) Pulmonary congestion. (4) Fluoroscopic findings.

Bing[2] states that cyanosis usually dates from birth in such cases and usually progresses in severity. It has been emphasized by Taussig[3] that progressive cardiac enlargement is common in such

cases but that progressive cardiac enlargement does not occur in patients having a tetralogy of Fallot.

It is also a well established observation that patients with a decreased pulmonary blood flow do not develop pulmonary congestion. As this patient did develop pulmonary congestion, it suggested the possibility of a cyanotic malformation in which pulmonary blood flow was adequate.

Taussig[4] indicates that the fluoroscopic features which are pathognomonic of transposition of the great vessels are a narrow aortic shadow in the anterior-posterior position and the wide aortic shadow in the left anterior-oblique position, combined with enlargement of both ventricles and the absence of fullness of the pulmonary conus.

Angiocardiography, while not absolutely necessary for diagnosis, serves principally to confirm the diagnosis and may furnish information concerning the type of communication that exists between the two sides of the heart.

In complete transposition of the great vessels, the aorta arises from the right ventricle while the pulmonary artery takes origin from the left ventricle. Essentially non-oxygenated blood leaves the right ventricle from which it passes through the aorta for systemic distribution, later returning by way of the vena cavae to the right auricle. The left ventricle pumps blood through the pulmonary artery to the lungs where, after oxygenation, it is brought back to the left auricle by the pulmonary veins. It is apparent, therefore, that in this condition two distinct circulatory systems exist. It is obvious, furthermore, that survival of the patient with this abnormality is dependent upon the existence of some type of communication between the two systems so that oxygenated blood from the pulmonary circuit may gain access to the tissues by way of the systemic circulation and an equal amount of non-oxygenated blood can be returned to the pulmonary circuit.

The communications are really compensating abnormalities, the type and number of which determine the length of life of the patient. As isolated defects, their order of efficiency for permitting free interchange of blood between the two systems seems to be a ventricular septal defect, an auricular septal defect, a patent ductus arteriosus, and partial transposition of the great veins. Obviously, a combination of an auricular and ventricular septal

defects offers the best prognosis. Any combination of compensating abnormalities may exist but, of all of them, a persistent functioning foramen ovale with a patent ductus arteriosus offers about the poorest prognosis. Of 117 cases of complete transposition of the great vessels with all types of communicating abnormalities, both single and multiple, reported by Blalock et al.[5], the average duration of life was 5½ months.

As mentioned previously, the type of complete transposition present in the case reported, i.e., with a patent ductus and a patent functioning foramen ovale, offers a poorer prognosis than most types of complete transposition. The reason for this becomes apparent when one considers that in complete transposition of the great vessels with either an interauricular or interventricular septal defect, or with both, blood will be shunted from the pulmonary circuit into the systemic, or vice versa, depending upon the pressure differences existing at any time between the two systems. In complete transposition of the great vessels with a patent ductus and patent functioning foramen ovale an unique situation exists. Inasmuch as the valve that covers the foramen ovale closes from left to right, blood will be shunted from the right auricle to the left auricle when pressure in the right auricle exceeds that in the left auricle, but blood never passes in the reverse direction irrespective of pressure differences. The ductus permits passage of blood in either direction, i.e., from the pulmonary circuit into the systemic, or from the systemic circuit into the pulmonic. Obviously, when this vessel begins to anatomically close, as it usually does normally within the first 16 weeks of life, a situation develops which is incompatible with life.

Blalock[5] and his associates must be given credit for their work in the development of procedures for relief of circulatory difficulties in patients with complete transposition of the great vessels. These procedures, obviously, are aimed at establishing communications between the two circuits. The operations fall into three main groups:

(1) Construction of extracardiac shunts, either venous or arterial. An example of this type of procedure is anastomosis of a pulmonic vein with the superior vena cava.

(2) Creation of an auricular septal defect.

(3) Creation of an auricular septal defect plus an extracardiac shunt.

Blalock has attempted and reported having done one of the above procedures on 33 patients. Of the first 28 patients operated, 22 died but this high mortality rate has been offset by survival of the last five patients. The highest percentage of survivals occurred in those 12 patients in whom both extracardiac and intracardiac shunts were established. Eight of these patients are living and most of these survivors appear improved.

While mortality figures for the surgical correction of transposition of the great vessels far exceeds the mortality figures for ligation of a patent ductus or the creation of an extracardiac shunt in tetralogy of Fallot, the development of newer operations and greater familiarity with procedures already known will undoubtedly lower this high surgical death rate. At least today some hope can be offered to many patients with complete transposition of the great vessels, a condition which in the past was invariably fatal in early infancy.

SUMMARY

1. A case of complete transposition of the great vessels with a patent ductus arteriosus and a patent foramen ovale is presented.

2. The circulatory dynamics of this cardiac anomaly are reviewed.

3. Reference is made to surgical procedures used today in the treatment of complete transposition of the great vessels.

The authors wish to make acknowledgment to Dr. Vincent Moragues and Mr. J. D. Brewer for the photography.

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PLACENTAL COCCIDIOIDES

Proof that Congenital Coccidioides is Nonexistent

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Rich[1] stated that it is now well-established that tuberculous infections can be transmitted from mother to fetus through the placenta.

The purpose of this paper is to show proof that disseminated coccidioides of pregnant women will not transmit the infection to their fetuses. Rich cites references wherein well-formed lesions containing tuberculous bacilli have been found in the viscera of infants that were born dead or that died a few hours after birth from tuberculous mothers. Lowenstein[2] has been able to produce congenital lesions in guinea pigs and demonstrate the tuberculous lesions.

Cohen[3] has reported that infants born of disseminated coccidioidal infected mothers will have the same complement fixation as the mother which represented passively transferred humoral antibodies of the mother. And that the complement fixation would be worn off after six weeks.

Smale and Birsner[4] discussed the problem of maternal deaths from coccidioides of disseminated status.

It is realized that the tubercle bacilli rarely if ever break through the placental barrier. However, all investigators agree that the existence of a filterable form is not impossible but the demonstration of its existence is another problem to convince the realists. On the other hand, the size of the spherules of coccidioides averages 40-70 microns in diameter. The largest noted was 262 microns according to Schenken[5], and the smallest size of the endospore has been reported as low as 2 microns. This is relatively one-fourth the size of a red blood cell. This size would, comparatively speaking, look like a mountain in respect to a tubercle bacillus.

The two cases herein mentioned are interesting because each bears out the other in proof. The first case is from the Kern General Hospital of Bakersfield, Calif., the heart of the endemic area of San Joaquin fever. The second case was loaned to me by Dr. E. M. Butt, chief pathologist of the Los Angeles County Hospital.

CASE REPORTS

Case 1. A 22-year-old female colored patient, para II, gravida IV, was admitted to the Kern General Hospital, December 29, 1949, because of a twenty-four hour episode of dizziness, headaches and vomiting. Her past history was noncontributory, except she lived in the heart of the San Joaquin valley, and has been exposed to an unusually dry spell associated with frequent dust storms.

The physical examination revealed a colored female who gave the physical signs of a five month's pregnancy. A verrucous lesion

Fig. 1. Case 1. Premature infant one month of age, still with a positive complement fixation for coccidioides.

was gradually occluding the nasal passages. A lumpy mass was present on the left cervical areas. A spina ventosa of the proximal phalanx of the left index finger was also present. Spherules were seen on aspiration material from the spina ventosa and nasal lesions which also gave pure cultures of coccidioides immitis. The serology showed a four plus in 1:2, 1:4, 1:8, 1:16 and 3 plus in a 1:32 dilution. To which Dr. Charles Ed. Smith of the University of California School of Public Health concluded that the findings confirm the diagnosis of disseminated coccidioidal infection. The

urine was essentially negative. Hemoglobin was 6.5 grams or 42 per cent. The R.B.C. was 3,200,000 with a color index of 0.7.

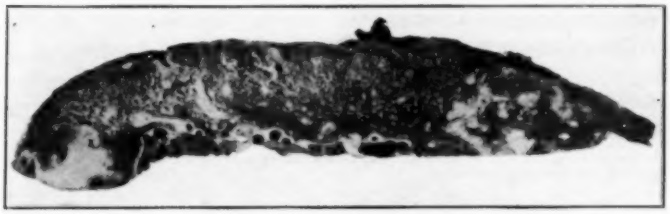

Fig. 2. Case 1. Placenta showing the multiple necrotic lesions of coccidioides.

The W.B.C. was 11,900 with lymphocytes 20 per cent, stabs 40 per cent and segmented 40 per cent. X-ray of the chest revealed

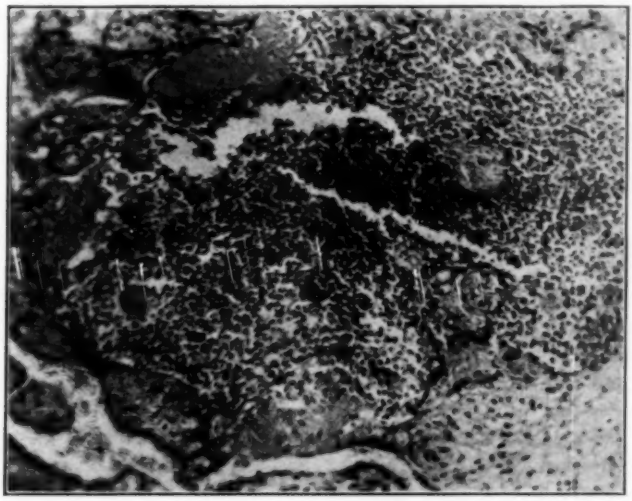

Fig. 3. Case 1. Low power showing spherules of coccidioides in the placenta.

miliary densities scattered throughout both lung fields. X-ray of the spina ventosa revealed bony destruction of the proximal phalanx of the left third finger.

The progress of the patient was stormy. The abscesses progressively enlarged and drained. The nasal passages were occluded. The patient gave a precipitated birth of a live premature female weighing 3 pounds 13 ounces two weeks before she expired.

The complement fixation of both were:

	1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:256
Mother	++++	++++	++++	++++	+++	0	0	0
Baby 1-20-50.....	++++	++++	++++	++++	+	0	0	0
Baby 2-20-50.....	++++	++	0	.....	..	..	..	..

Shows a marked fall in titer of complement fixing antibodies which favors a passive transfer of humoral antibodies.

The infant did fairly well, had a hemoglobin of 14.8 grams and died after one month of possible aspiration pneumonia.

The pathological report of the placenta revealed:

Gross. Specimen consists of a placenta, fetal membranes and umbilical cord which weighed 315 grams. The placenta measures 16 cm. x .2 cm. x 2.3 cm. The umbilical cord measures 25 cm. in length. The placenta and fetal membranes both appear intact. There are scattered circumscribed yellowish-white regions within the placental tissue measuring up to 2 to 3 mm. in diameter. Sectioning the placenta, there are numerous regions similar to those described and in some areas they are confluent. Nowhere is any abscess formation demonstrated.

Microscopic. Sections of placental tissue reveal numerous large and small lesions both in the decidua and in the chorionic villi. The lesions are necrotic, some appearing caseous, others frankly purulent. These lesions are filled with spherules of coccidioides immitis. Spherules are of all sizes and all stages of development. Some large spherules are seen containing endospores which are encapsulated. Sections of umbilical cord show no remarkable inflammatory lesions.

Diagnosis. Coccidioidomycosis of the placenta. The post-mortem examination of the premature infant was entirely negative for coccidioidal infection. This included the organs and soft tissue allowable through a limited necropsy permit.

Case 2. Summary of clinical history: A 34-year-old colored female was born in the United States. She had lived in California three years and in October she went to a place near Fresno to pick cotton. One month after coming back to Los Angeles, she developed

a throbbing headache at night. It became severe and persisted throughout the month. Three days before admittance (December 18, 1948), she developed a stiff neck. She had been ambulatory throughout her illness and is said not to have had chills or fever, and has never noted a skin rash. Patient was approximately four months pregnant.

Physical Examination. Temperature 102° F., pulse 100, respira-

Fig. 4. Case 2. Premature infant with placenta attached, showing the granulomatous lesions.

tions 28. Patient appears about four months pregnant. She is somewhat confused mentally and is acutely ill. There is a raised verrucous lesion about the left side of the external nares about 2.5 cm. in diameter. The superficial lesion is necrotic. Neck is spastic on flexion. No adenopathy noted. Heart is not enlarged.

Fundus of the uterus three-fourths of the distance of the symphysis to the umbilicus. Kernig and Brudzinski tests are negative.

Laboratory. Hemoglobin 11 grams. W.B.C. 8,600 with 60 per cent polys. Blood Wassermann and Kahn are negative. Spinal fluid: Pandy is negative; 390 cells. Classification: Moderate number of polymorphonuclears, few lymphocytes. Sugar 9 drops (below normal); chlorides 696 mgm.%; with normal pressure. Smear is negative for organisms. The complement fixation test for coccidioides positive through 5 tubes beginning with 0.2 cc.

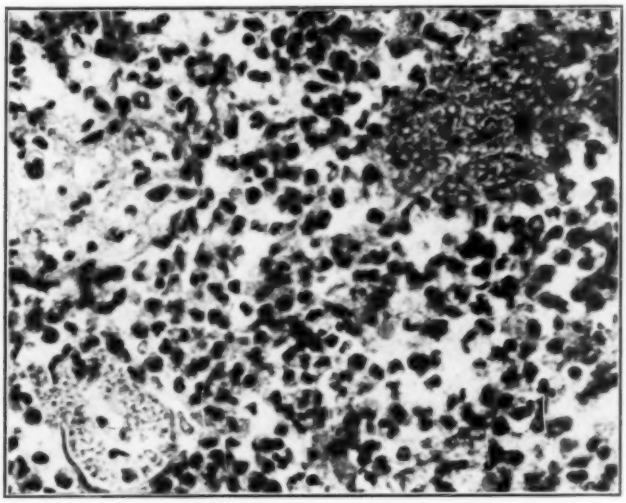

Fig. 5. Case 2. High power showing ruptured spherules with endospores.

of serum and continuing in half dilutions to the sixth tube. December 29, 1948, coccidioides immitis obtained from nasal lesion and also recovered from the spinal fluid. Complement fixation of the spinal fluid was positive through 0.5 to 0.3 dilution of the serum.

Progress. A downhill course. The baby was delivered and born dead within six hours of the time of the mother's death (January 4, 1949).

Clinical Diagnosis. Coccidioidomycosis meningitis and spontaneous abortion of approximately a 5 months pregnancy.

The pertinent facts of the mother's post-mortem revealed that the central nervous system had shown flat convolutions of the hemispheres and the sulci reduced in size. The brain weighed 1,130 gms. In the pia-arachnoid spaces over the base of the brain there was some thick milky exudate. At irregular intervals, small tiny tubercles were noted in the reflections of the arachnoid over the regions of the vessels and in the sylvian fissures. There were cystic areas in the choroid plexus of the lateral ventricles and in the fourth ventricles. The ventricles were not dilated. The cystic areas were involved with granulomatous processes.

There were necrotic and verrucous nasal lesions on the left external nares. The respiratory system also had fine miliary spread of small grayish-white tubercles about 1-2 mm. in diameter. The spleen and lymphatic system also showed evidences of many grayish irregular nodules in the pulp. The microscopic study revealed that the lungs had scattered cellular tubercles with foreign body giant cells and spherules within the sporulation. The liver, lymph nodes, brain, pituitary and adrenals showed the characteristic spherules of coccidioides.

Final Diagnosis. Disseminated coccidioides, coccidioides meningitis and pulmonary coccidioides.

The anatomical summary of the negro male stillborn: The body is that of a premature male infant, having a weight of 1.2 kilos (2.64 pounds); length not taken. A long cord is attached with placenta. The placenta has a diameter of about 14 cms. The cotyledons appear to be intact. Scattered throughout the placenta, there are many irregular spaced caseous areas varying in size from 0.1 to 1.5 cms. in diameter. No lesions are noted of the chorion or amnion, and while the cord is edematous, no lesions are noted of this structure. The umbilical vein is patent and no lesions are present in this structure or in the lymph nodes at the hilus of the liver. There is much molding of the head with some overlapping of the bones. The skin in places is hemorrhagic and loose. Respiratory system shows some extreme atelectasis. The other organs are essentially negative. The microscopic examination revealed the liver to have capillary congestion, and scattered throughout were a number of small blood islands. The heart muscle showed con-

gested vessels. The lungs showed marked atelectasis with desquamation of the epithelium of the bronchi. The placenta contained areas of heavy polynuclear leukocytic infiltrations and caseations in which there were many spherules and endospores.

DISCUSSION

It would seem that if congenital tuberculosis does periodically make itself known even though a rare entity that coccidioides would manifest itself too as a congenital lesion and on a rare basis.

Kirschbaum et al.[6], in their review of 52 fatal cases of disseminated coccidioides, did not report a single infection of the uterus or placenta. Conan et al.[7], described the first primary endometrial infection from which the patient died. The potential setting of infection exists but the fact remains that though both diseases have almost the identical pathology as to the granuloma and giant cells, except the etiological agent, nevertheless the small endospores cannot pass through the placental barrier as shown on the microscopic pictures herein. Unless a tear exists in the placental membrane the endospores will never pass to the fetus from the mother. That both fetuses were examined in two different cases by two different pathologists and found to be free of any coccidioidal infections though offsprings of fatal disseminated cases is so far prima facie evidence that congenital coccidioides is nonexistent.

CONCLUSION

Two fetuses, offsprings of two fatal disseminated coccidioidal cases, having both had infected placentas, failed to show any evidence of congenital coccidioides to exist as an entity.

The author wishes to express his gratitude to Dr. Robert Huntington, pathologist of Kern General Hospital, and Dr. E. M. Butt, pathologist of the Los Angeles County Hospital, for their cooperation in the material for this publication.

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CLINICAL REVIEW

In order to encourage the writing of clinical articles by recent graduates or senior medical students, the ARCHIVES *will publish monthly at least one such paper from the classes of Doctor Reuel A. Benson, New York Medical College, New York, and Doctor Philip Moen Stimson, Cornell Medical School, New York. Other interested medical schools are cordially invited to submit student papers for consideration.*

THE COXSACKIE VIRUS*

A REVIEW OF THE LITERATURE AND AN ANALYSIS OF ONE HUNDRED AND EIGHTY-TWO CONSECUTIVE CASES OF POLIOMYELITIS ADMITTED IN THE PAST YEAR TO THE ISOLATION UNIT OF THE J. J. McCOOK MEMORIAL HOSPITAL, HARTFORD, CONN.

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New York.

During the past few years it has become increasingly evident to those engaged in experimental viral studies that there may be one or more viruses that cause a disease clinically resembling acute infectious poliomyelitis.[1-7] That this virus or these viruses are not of the poliomyelitis family can be shown by laboratory studies.

Before proceeding further along this line of discussion, a review of other existing concepts is necessary. Many students of poliomyelitis maintain, or did maintain, that all nonparalytic cases of poliomyelitis have the same etiological agent as the paralytic form. They state that one or more of the following conditions exist: the virus is of low virulence, the host has a high resistance, that not enough anterior horn cells were destroyed to show a clinical paralysis, or that the patient was not examined minutely enough to demonstrate a paralysis. Each of these concepts has clinical or laboratory evidence to substantiate it.

To differentiate whether the virus is of low virulence or the host is of high resistance is difficult, and no attempt will be made. That one of these concepts occurs, however, is evident from the following. Work on laboratory animals has demonstrated that the virus of poliomyelitis may cause a minimal degree of encepha-

*Submitted as partial fulfillment of the requirements of the course in Senior Pediatrics at the New York Medical College, Flower and Fifth Avenue Hospitals, New York.

litis limited to the region of ingress into the central nervous system, which is almost invariably the brain.[8] In these experiments no involvement of the anterior horn cells of the spinal cord was found. There is no report on whether passage of virus isolated from these animals to other animals was attempted. In another series of experiments which are similar, we do find such a report. In this group of experiments[9] a destruction of an appreciable number of the anterior horn cells was found almost invariably in the nonparalytic form of the disease in the rhesus monkey. It was postulated that failure of the process to proceed to paralysis was dependent upon an equilibrium between the virus and the host. In sixteen of such animals, passage of suspensions of their spinal cord was successful in two instances of producing paralytic poliomyelitis in other monkeys. A transitory paralysis was noted in some of the first passage monkeys of the second group of experiments. Those reporting these results stated that this last fact depended in part on the fact that less than the full number of nerve cells is necessary for apparently normal function, and also the possibility that not all nerve cells attacked by the virus are irreversibly destroyed.

The claim that all cases of nonparalytic poliomyelitis will demonstrate some paralysis, however minimal, is made by some neurologists. Their statement is difficult to refute, as they may say that our present methods of examination are too gross. It is not the purpose of this paper to get into this argument. But it can be stated that at the present time there are patients who do not show any clinical paralysis by present day methods of examination, but who do show other clinical and laboratory criteria consistent with a diagnosis of poliomyelitis.

These concepts of nonparalytic poliomyelitis, in all probability, are true in so far as they go. In the light of present day experiments, however, they probably do not account for all the nonparalytic cases seen. There is increasing experimental evidence that there is another etiological agent responsible for some of these nonparalytic cases.

To date the evidence for the existence of this virus is not entirely conclusive. It has been stated that its presence in the stools of nonparalytic patients is possibly coincidental. A great deal more work is needed before any definite conclusions can be made.

This new virus, which has been labeled the Coxsackie virus, has certain definite criteria by which it may be identified. These include its source, host range, histopathological manifestations and immunological relationships. The only source of the virus has been the stools of patients with the clinical diagnosis of nonparalytic poliomyelitis. Attempts at isolation from other parts of the body or its secretion have met with failure. Its host range consists of suckling mice and hamsters. Passage to adult mice or hamsters or to the rhesus monkey has not been accomplished. Seemingly conflicting reports have occurred in regard to this point. One group of workers[5] reported that in a series of ten thousand cases of nonparalytic poliomyelitis over a four week period, passage of a virus virulent for monkeys was accomplished in a few instances. This can be explained on the basis that these few patients were actually infected with the poliomyelitis virus but did not show a clinical paralysis for reasons discussed above. In no instance was the virus that was virulent for the suckling mice and hamsters successfully passed to the rhesus monkey.[2, 6, 7] Autopsy of the mice infected with this virus failed to reveal any involvement of the central nervous system, but did show a response in the striated muscle. The tissues of the central nervous system, however, did show a high infecting titer and were used for secondary transfers successfully in many instances.[6] The lesions in the striated muscles began as hyaline degeneration and progressed to complete destruction of the muscle fibers. Transformation into amorphous masses occurs, followed by absorption and phagocytosis. Regeneration begins promptly. An immunologic response in patients from whom this virus was isolated has been demonstrated. In some, a neutralizing activity of the serum has been shown in the acute phase plus a convalescent activity. To date three serologic types have been encountered.

At this point a review of an article by Dalldorf and Sickles[3] will be of considerable aid. In this report they discussed two patients in detail. Both patients went through an acute episode resembling acute infectious anterior poliomyelitis in all clinical aspects. After the acute process, patient T. T. was left with a paralysis of the back muscles which cleared completely in one year. Patient K. H. was left with a weakness of the adductors of the left thigh and inversion of the left foot on walking which cleared in eight months. Both patients yielded an agent from their stool infectious for

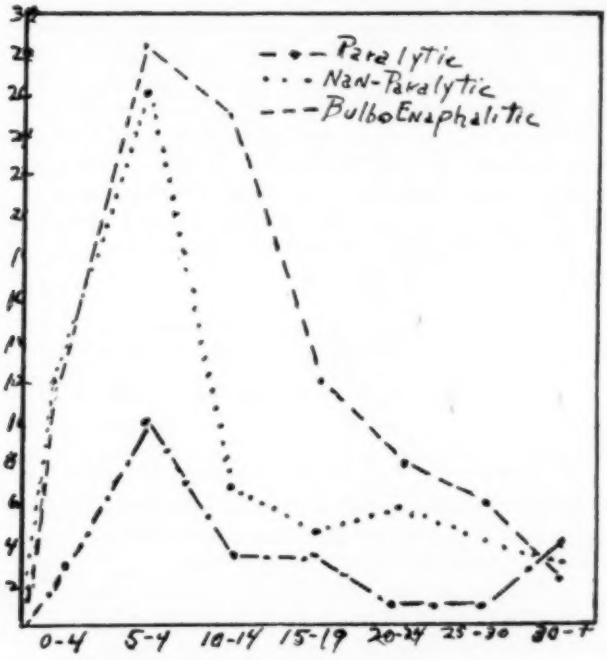
suckling mice but having no effect upon the rhesus monkey. K. H. had no neutralizing activity in the acute phase serum but did in convalescent serum, whereas T. T. showed neutralizing activity in acute phase serum increasing ten fold in twenty-three days and then diminishing. Neutralizing activity titers were performed on ten contacts. Of these, five had neutralizing activity in convalescent phase serum and all had neutralizing activity toward the Lansing strain of the poliomyelitis virus. The above cases clearly demonstrate the points discussed previously and add one vital fact: a person infected with this suckling mouse virus is capable of showing muscular paralysis, at least for a limited time. This fact may explain some of the marvelous "cures" produced in paralyzed patients. At this writing no autopsy studies or muscle biopsies have been reported on patients from whom this virus was isolated. It may be that the human will show the same histopathologic picture as that seen in the mouse.

In conclusion of this review of the experimental studies on the Coxsackie group of viruses, it is to be reiterated that the virus has not been positively proven to be an etiological agent of disease in man. The evidence so far only points toward this concept. That this proof is not far off can be reasoned from the mass of knowledge that has been ascertained in such a short time.

The existence of two distinct diseases always brings about the question: "How can we differentiate them from one another?" With this question in mind an analysis was made of one-hundred and eighty-two consecutive cases of poliomyelitis admitted to the Isolation Unit of the J. J. McCook Memorial Hospital, Hartford, Connecticut. This covered the period from January 1, 1949 through November 30, 1949. Nearly ever case considered to be poliomyelitis occurring in Central and Northern Connecticut during this period was admitted to this hospital. There is, however, one great defect in this analysis. All the cases of poliomyelitis or poliomyelitis-like infection not exhibiting clinical signs of paralysis were grouped together and designated the nonparalytic group. If our previous discussion is true, some of the patients were infected with the actual poliomyelitis virus and others with the Coxsackie virus. It was felt though that some information might be gained by a comparison of this nonparalytic group to the paralytic group.

There were 92 nonparalytic cases, 63 paralytic cases, 21 bulbar cases and 6 encephalitic cases. A total of ten deaths occurred. Six of these deaths were in the bulbar group, three in the encephalitic and one in the paralytic. No deaths were reported from the nonparalytic group.

Only points over which there was considerable control were included in this analysis. They include the monthly incidence,



Graph 1. Incidence of cases according to months.

age distribution and spinal fluid studies. The history and physical would in all probability be of interest to analyze, but there was not sufficient unanimity in the write-up of the charts to permit this.

MONTHLY INCIDENCE

The stimulus for this monthly incidence study was provided

by Curnen et al.[1] The following is a quotation from their article: "The weekly incidence of paralytic cases increased during September, was maximal in the first week of October and declined sharply thereafter . . . The incidence of nonparalytic cases was distinctly different. Beginning in the middle of July the number of cases increased sharply to a peak at the end of July, declined in the next two weeks, and then rose again to a similar peak in the fourth week in August."

The figures from the epidemic being reported serve to substantiate the claims of these workers. The incidence of nonparalytic cases slowly began in June, increased in July, reached its peak in August, and showed a steady decline thereafter.

The curve in Graph 1 for the nonparalytic cases does not correspond exactly with that of Curnen's in that it does not show the camel hump illustrated by his graph. This is because his was plotted on the weekly incidence, and this one on a monthly basis. But they both illustrate that the peak incidence for nonparalytic poliomyelitis is in July and August.

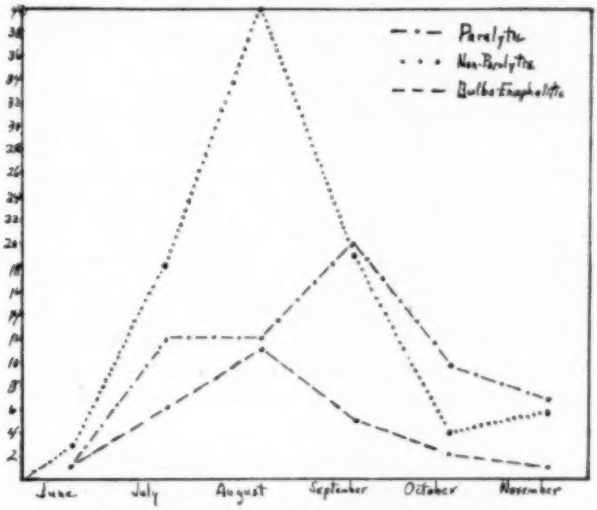
TABLE I. *Monthly Distribution*

	Feb.	April	June	July	Aug.	Sept.	Oct.	Nov.	Total	Total Before Sept. 1	% Before Sept. 1
Paralytic	1	0	1	12	12	20	10	7	63	26	41.26%
Nonparalytic	0	1	3	18	41	19	4	6	92	62	67.4 %
Bulbo-encephalitic ...	0	0	1	6	11	5	3	1	27	18	74.1 %

The paralytic cases began at the same time, had a slightly less rapid rise in July, levelled off in August, and did not reach their peak until a whole month later in September.

If we accept the fact that there is a decided seasonal change occurring near the first of September in Connecticut, a fact of some importance may be illustrated. Only twenty-six, or 41.3 per cent, of the total paralytic cases occurred previous to September first. In contradistinction to this, sixty-two, or 67.4 per cent, of the nonparalytic cases occurred prior to this date. The fact that this occurred in two consecutive years in the same locale cannot be interpreted as chance. There must be some definite reason. There are at present two major schools of thought on this subject. One group states that the seasonal change exerts an influence upon the poliomyelitis virus or the host. The other, substantiated by laboratory work, states that one virus is prevalent at one season and the other in a later season.

The monthly incidence of the bulbo-encephalitic group deserves careful consideration. Considering the above seasonal difference between paralytic and nonparalytic poliomyelitis, the bulbo-encephalitics present a paradox. This form of the disease is a paralytic one, in fact more serious in its paralytic aspect than the spinal-paralytic form. It would be expected, therefore, that its monthly incidence would parallel that of the spinal paralytic group. And yet we find that this is not so, but that it parallels



Graph 2. Incidence of cases according to age.

that of the nonparalytic group, as can be seen on Graph 1. No suggestion is going to be offered to account for this, but it might be of interest to do viral studies on this group similar to those being done on the nonparalytic group.

AGE DISTRIBUTION

There has been much discussion of the relative increased incidence of paralytic poliomyelitis in adults and nonparalytic poliomyelitis in children. These facts are true, but the age distribution in this epidemic under consideration indicates that both forms still remain essentially diseases of childhood. Over two-thirds (126) of the cases appeared in children under the age of fifteen years.

There was an almost identical age distribution between the paralytic and nonparalytic groups. Seventy-one per cent of the paralytic cases and seventy per cent of the nonparalytic cases are included in the age group of zero through fifteen years.

The peak incidence for all three groups was in patients five through nine years, inclusive. This includes 26 of the paralytics, 28 of the nonparalytics, and 10 of the bulbo-encephalitics. Graph 2 merely illustrates the points discussed.

Dr. Albert B. Sabin has made an exhaustive study of the age distribution of poliomyelitis. In his paper, "Epidemiologic Patterns of Poliomyelitis in Different Parts of the World," he states: "One inescapable fact is that, regardless of how you analyze it, poliomyelitis is becoming less and less infantile in many parts of the world. . . . That this trend does not depend on the inclusion of larger numbers of nonparalytic cases is evident from the data shown for Cincinnati and Copenhagen based on paralytic cases only. As a matter of fact the data for Cincinnati show that inclusion of the reported nonparalytic cases does not change the pattern appreciably." It is the last sentence of Dr. Sabin's that should be emphasized here. This statement, based on an analysis covering many years and all parts of the world, coincides with results found in this epidemic, namely, that there is no difference in the age distribution of patients with paralytic and nonparalytic poliomyelitis.

LABORATORY REPORTS ON SPINAL FLUID CHANGES

The results of the spinal fluid examination were not available for all the cases under consideration. In the majority of these omissions it was because the diagnostic spinal tap was done in another hospital, and a written report was not submitted. In some instances the report on the chart was incomplete; one of the tests was omitted.

TABLE 2. *Incidence of Cases According to mgs. % of Protein in the Spinal Fluid*

	0-14	15-40	41-75	76-100	100+	% of Total 15-40
Paralytic	0	15	22	6	5	31
Nonparalytic	2	34	28	9	6	44
Bulbo-encephalitic	0	7	9	5	0	33

TOTAL PROTEIN

One hundred and forty-five of the cases had reports on the total protein in the spinal fluid. Seventy-six per cent of the paralytic group, eighty-three per cent of the nonparalytic group, and seventy-seven per cent of the bulbo-encephalitic group were reported. A normal reading was considered to be between 15 and 40 mgs. per 100 cc. of spinal fluid.

Only two cases were below normal and both were of the nonparalytic group.

Fifty-six, or 39 per cent, of the one hundred and forty-five fell within normal limits. Of these, 60 per cent were of the nonparalytic group. But if we determine the percentage of the nonparalytic group having a normal reading we find that it is only 44 per cent as compared to 31 per cent and 33 per cent for the paralytic and bulbo-encephalitic groups, respectively.

To attempt to use the above figures as a differential diagnostic sign between the nonparalytic and paralytic groups is impractical. A sixty per cent chance of making the diagnosis of nonparalytic polio, as opposed to paralytic, and thereby assuming an air of optimism, is unfair to the patient, the parents, and the doctor himself.

TOTAL WHITE COUNT OF CELLS IN THE SPINAL FLUID

Of the total one hundred and eighty-two cases there were white counts of the spinal fluid present on one hundred and sixty-four. Fifty-four of the paralytic group, eighty-six of the nonparalytic group, and twenty-four of the bulbo-encephalitic group were reported.

A count of 0-10 was considered to be normal. A total of thirteen, or 8 per cent, of the one hundred and sixty-four fell within this normal range. Of these, four were of the paralytic group, seven of the nonparalytic group, and two of the bulbo-encephalitic group. This normal value has been noted previously in the literature,[17] but no explanation of any worth has been made to date. An extremely severe form of paralysis may set in with no increase in the count.

TABLE 3. *Incidence of Cases According to the Number of White Cells per cu. mm. of Spinal Fluid*

	0-10	11-150	151 +
Paralytic	4	37	13
Nonparalytic	7	54	25
Bulbo-encephalitic	2	18	4

The largest number of patients of all three groups had a count ranging from 11 to 150 cells. This is in complete agreement with previous reports. The paralytic and nonparalytic groups did not differ significantly from each other as may be seen from Table 3. Sixty-eight per cent of the paralytics, fifty-four per cent of the nonparalytics, and seventy-five per cent of the bulbo-encephalitics are included in this range. Differential counts were performed on all of these patients. Kolmer,[18] however, in his discussion of differential counts on spinal fluid states; "When fluids contain less than 300 cells per cmm. they (differential counts) are, however, scarcely worthwhile because . . . experience has shown that under these conditions the cells are essentially small lymphocytes." In view of this, the differential count was discarded as a possible differential diagnostic point.

From these facts it is obvious that the total white cell count and cell differential, although of aid in making a diagnosis of virus infection within the cord, does not help in making a differential diagnosis between paralytic and nonparalytic poliomyelitis.

OTHER LABORATORY PROCEDURES

The Pandy test was performed in most instances along with the total protein determination. No actual analysis of the results was made, but in the majority of cases of all three groups, a one, two, or three plus report was made. This analysis was not carried out, as the reading of this test is entirely subjective, and four technicians read the results at various times. For this reason the difference between a one and two plus or a two and three plus cannot have much significance.

A determination of the amount of sugar in the spinal fluid is only of aid in differentiating a viral from a bacterial infection. In a viral infection, such as poliomyelitis, the sugar content is almost invariably normal. The cases in this series, except for a very few exceptions, presented a normal sugar. The few excep-

tions encountered could not be interpreted as being due to the type of infection present; other variants, of which there are many, may have accounted for these results.

SUMMARY

A review of the available literature on the existence of a new virus was presented. This virus is thought to be the causative agent of a disease clinically resembling nonparalytic poliomyelitis. The criteria for the identification of this virus was discussed. An analysis of 182 cases of poliomyelitis or poliomyelitis-like infection was made. From this analysis it is possible to draw the following conclusions:

1. The virus has a different seasonal incidence than that of the poliomyelitis virus.

2. There is no difference in the age distribution of patients afflicted with these two viruses.

3. Routine spinal fluid studies are of no aid in making a differential diagnosis between the two viruses.

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ASCORBIC ACID THERAPY IN WHOOPING COUGH. (Maandschrift voor Kindergeneeskunde, Leyden, 17: 367, 1950). De Wit administered ascorbic acid to 90 children with whooping cough. The vitamin was given by injection or by mouth. The children were given 500 mg. daily for the first seven days. After that the dosage was reduced by 100 mg. every two days until it was 100 mg. a day, this dose being continued until cure had been obtained. The disease usually ran its course in 15 days in the children who were given the vitamin by injection and 20 days in those who were given it by mouth. The average duration in 20 children treated by vaccine was 34 days. When ascorbic acid therapy was started during the catarrhal stage, the spasmodic stage was prevented in 75 per cent of the cases, and the number of complications was negligible. The ascorbic acid excretion curves in the urine showed that the excretion was far less than the intake. Absorption and excretion of ascorbic acid became equal three days after clinical cure, which indicates that it would be wise to prolong the treatment for about that time after an apparent clinical recovery.—*Journal A.M.A.*

CLINICAL REVIEW

In order to encourage the writing of clinical articles by recent graduates or senior medical students, the ARCHIVES *will publish monthly at least one such paper from the classes of Doctor Reuel A. Benson, New York Medical College, New York, and Doctor Philip Moen Stimson, Cornell Medical School, New York. Other interested medical schools are cordially invited to submit student papers for consideration.*

RETROLENTAL FIBROPLASIA*

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One of the most common causes of blindness in young children is retrolental fibroplasia. About six hundred cases occur each year in the United States. As the name implies, a fibrovascular sheath appears behind the lens, resulting in total loss of vision. The syndrome was recently described by Terry,[1] but evidence of its existence goes back to the work of Howard[2] in 1851. The etiology of the disease is still obscure, but the large amount of literature eliminating certain etiological factors, and accentuating others, warrants a review of the subject.

ETIOLOGICAL FACTORS

(1) Although the syndrome is known to occur rarely in full term infants, *prematurity* seems to be a definite causative factor. Terry[5] stated that 12 per cent of all prematures, weighing three pounds or less at birth, had retrolental fibroplasia. Owens[11] reported an incidence of 1.3 per cent in the group of infants weighing from three to four and one-half pounds at birth. Terry[6] believed that the ratio of retrolental fibroplasia in prematures (infants weighing less than five and one-half pounds at birth) to that occurring in full term infants was 162:4.

(2) It appears that the condition is *nonhereditary*, since it may involve only one of identical twins.[4]

(3) The association of the syndrome with *cutaneous hemangiomata*, was greater than the incidence of cutaneous hemangiomata in infants without retrolental fibroplasia.[8]

All other causative factors which have been implicated, are either disproven, or are still very much debatable.

*Submitted as partial fulfillment of the requirements of the course in Senior Pediatrics at the New York Medical College, Flower and Fifth Avenue Hospitals, New York.

(a) *Is retrolental fibroplasia a congenital lesion?*

The consensus of opinion is that the type of lesion which occurs in full term infants, and which is predominantly unilateral, is congenital in origin and is noticed in the first few days or weeks of life.[30] On the other hand, it is believed that the far more common type of lesion (that seen in prematures), which is most often bilateral, and is noticed after the third or fourth month of life, is not congenital, but is a postnatal development.[15]

(b) *Is birth trauma, or the nutritional status of the mother a factor?*

It would seem that these are not causative factors, according to the extensive work of Speert et al.[27], and Kinsey and Zacharias.[12]

(c) *Is age or parity of the mother a factor?*

Once again, the incidence of retrolental fibroplasia did not seem to follow maternal aging or parity.[27]

(d) *Is maternal infection a factor?*

Since rubella contracted by the mother in the first trimester is a known cause of congenital defects, maternal infection was incriminated in retrolental fibroplasia. However, there is no conclusive evidence at present to include maternal infection as a causative factor.

(e) *What postnatal factors are of importance?*

(1) *Premature exposure to light.* Terry originally believed that this was a very important causative factor. He stated[5] that activation of pupillary and ciliary muscles may be caused by premature exposure to light, resulting in a failure of production or accumulation of aqueous humor. Due to this failure, the lens may be dependent upon the hyaloid artery and the tunica vasculosa lentis for its nutrition, thereby causing a persistence of these structures. Intriguing as this theory may be, Hepner et al.[31] have very recently indicated that light is not an etiological factor.

(2) *Sudden burden on the hemovascular system of the premature at birth.* Terry[4] felt that the premature shift to the infant's own circulation for dependence at birth, and the resulting increased blood pressure and physiological anemia might be a factor. Perhaps, too, the immaturity of the vascular system in the premature may also be responsible for the cutaneous hemangiomata which are sometimes associated with retrolental fibroplasia.

Reese and Payne[8] believe that the angioblastic response in the

skin and in the vitreous may result from congenital rests of angioblastic tissue. Perhaps these "rests" are activated after birth by the failure of the premature's own circulation to perform its function adequately.

Owens and Owens,[11] in a very interesting report, state that the syndrome is not due to "an arrest in growth or aberration of some embryonic or fetal structure, i.e., the hyaloid artery system," but is rather the extension of a membrane behind the lens, from a detached retina which is the primary lesion. Unsworth[15] corroborates this work, in part.

(3) *Postnatal medication or diet of the premature infant.* Kinsey and Zacharias[12] believed that the correlation between the increased use of water-miscible vitamin products and iron in premature infants, and the increased incidence of retrolental fibroplasia might be significant. Not enough data has been accumulated, as yet, to draw a conclusion.

Clifford and Weller[20] have done work on the use of vitamins prophylactically in this syndrome and find that large doses of vitamins A and D will not prevent it. Owens[32] noted that diets of prematures contained little of the fat-soluble vitamins, and suggested the use of dl-alphatocopherol acetate (50 milligrams every eight hours) as a preventative. In only one of twenty-three infants so treated did retrolental fibroplasia develop, whereas seventeen of seventy-eight untreated infants developed the disease. Although such results are encouraging, more clinical trials must be made before a conclusion may be drawn.

CLINICAL PICTURE

It is now believed that retrolental fibroplasia in the premature infant and "persistence and hyperplasia of the primary vitreous" in the full term infant are two distinct entities.[30]

(1) *Description of Retrolental Fibroplasia in the Premature Infant.*

(a) A lesion believed to develop postnatally, and first noted between three and four months of age.
(b) Bilateral: present in 12-18 per cent of prematures.
(c) Grayish, opaque, vascularized tissue behind the crystalline lens, where vessels seem to radiate from a central point.
(d) Microphthalmus: sunken lower lid.

(e) Shallow or absent anterior chamber.
(f) Fetal-blue colored iris, slowly changing to grayish-blue or dirty brown.
(g) Thin ciliary processes (dentate processes) seen in front of the opaque tissue, when viewed from the extreme periphery.
(h) Searching nystagmus, with a lateral, rocking motion of the head (described as "elephantine").[25]
(i) Apparent photophobia (infants cover their eyes when exposed to a bright light). Also characteristic is the fact that the infants are continually rubbing their eyes.
(j) Retinal detachment or maldevelopment is almost always found, and is the limiting factor in treatment.
(k) Anterior and posterior synechiae develop, resulting in secondary glaucoma unless prevented by daily miotics.

(2) *Description of "persistence and hyperplasia of the primary vitreous" in full term infants.*

(a) Far less common than that seen in prematures.
(b) Believed to be a congenital lesion.
(c) First noted a few days or weeks after birth.
(d) Usually monocular.
(e) Very much less microphthalmus than in true retrolental fibroplasia.
(f) Resembles a pseudoglioma clinically.

DIFFERENTIAL DIAGNOSIS

There are three conditions which should be differentiated from retrolental fibroplasia and persistence and hyperplasia of the primary vitreous.[25]

(a) *Retinoblastoma.* A malignant tumor of the eye which transmits a yellowish light reflex, and is definitely separated from the lens. The eye involved is normal in size or slightly enlarged. Many infants have had enucleation procedures performed because this disease was confused with retrolental fibroplasia.

(b) *Serous detachment of the retina.* Again, there is a definite separation of the lesion from the lens, and the eye is easily transilluminated. The eye may be smaller than normal.

(c) *Congenital cataract.* Examination of this case will reveal a milky opaque lens in an eye of normal size. Perhaps a history of rubella in the mother in the first trimester may be elicited.

TREATMENT

There is no satisfactory treatment for retrolental fibroplasia or persistence and hyperplasia of the primary vitreous. Prevention seems to be the only answer.

Various measures have been employed, from nothing to enucleation of the affected eye (with a mistaken diagnosis of retinoblastoma). Irradiation, diathermy and surgery, including discission of the membrane, lens removal and section of the membrane, and incision of the ciliary body with withdrawl of the membrane, have been tried with little success. A very limiting factor in treatment is the degenerated condition of the retina, so that sight cannot be restored. The work of Owens[22] with prophylactic doses of vitamin E to prematures is encouraging, and needs further study.

SOCIAL FACTORS

The anxiety which ensues over a premature birth, when further complicated by retrolental fibroplasia, is an obstacle difficult to overcome. The parental feelings of guilt and frustration may be insurmountable. Proper training by special preschool teachers, with instruction of the afflicted child in everyday duties, and in how to appreciate the world about him not only aid the patient, but also give the parents a better outlook.[22] Although Krause[21] believed that the disease was accompanied by cerebral dysplasia, many of these infants may be taught to approach "normalcy" in their day to day existence.

SUMMARY

(1) Retrolental fibroplasia is a common cause of blindness in young children.

(2) The syndrome occurs in 12-18 per cent of premature births.

(3) In about 15 per cent of cases, cutaneous hemangiomata are associated.

(4) The etiology of the disease is still unknown.

(5) Prevention seems to be the only means of control.

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PENICILLIN SODIUM AND PROCAINE PENICILLIN IN SCARLET FEVER. (Ugeskrift for Laeger, Copenhagen, 112:582, April 27, 1950). Jersild and his associates state that treatment of patients with scarlet fever with one daily injection of procaine penicillin in aqueous suspension is as effective as treatment with two daily injections of penicillin sodium. They observed two uniform groups of patients with scarlet fever; 101 patients were treated with two injections of sodium penicillin daily for six days and 109 with procaine penicillin in aqueous suspension daily for six days, the daily dose being the same. No definite difference was seen in therapeutic effect, evaluated according to frequency of complications, duration of primary rise in temperature, bacteriologic observations, sedimentation rate and antistreptolysin titer. No local or general by-effects of treatment with procaine penicillin in aqueous suspension were observed.—*Journal A.M.A.*

PEDIATRICS HALF A CENTURY AGO

From time to time the Archives, which was the first Children's Journal in the English language, will reprint contributions by the pioneers of the specialty over fifty years ago. It is believed that our readers will be interested in reviewing such early pediatric thought.

ACUTE NON-SUPPURATIVE ENCEPHALITIS IN CHILDREN*

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Acute non-suppurative encephalitis is neither a rare nor new disease among children. Striking cases, however, are of interest. Attention was first called to this class of cases by Strumpell in 1884: "Cerebral palsies in children depend upon inflammation of the gray substance of the motor cortex. There is, therefore, an acute polioencephalitis analogous to acute poliomyelitis. Both depend upon the same infection which sometimes becomes localized in the brain, sometimes in the cord." Strumpell's publication aroused much interest, and subsequent investigations were made by Bernhardt, Wollenberg, Krast and Moebius in Germany; Marie in France; Ross, Abercrombie, Gowers and Ashby in England; Sachs, Peterson and Osler in the United States. With the evolution of the subject, it became evident that Strumpell was not entirely correct in the assumption that cerebral palsy in children was due to a single process, but to several pathological changes, such as cerebral hemorrhage, embolism and thrombosis, with resulting sclerosis, or porencephaly. Hence polioencephalitis was responsible for the cerebral palsies in only a proportion of the cases. Sachs stated that the disease, polioencephalitis, is open to question. He doubted the existence of such a morbid entity. During the last few years, however, many contributions have been made to the subject, and there remains no doubt that Strumpell's position was essentially correct, that acute encephalitis is responsible for a proportion of the cases of hemiplegia in young life. Freud estimates that one-third of all the cases of hemiplegia in children are infectious in origin.

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In looking over a large number of histories of this disease, one cannot fail to be impressed with the fact that there are several clinical types of this disease. Batten believes that acute poliomyelitis and encephalitis are often associated and suggests as a classification: (1) Acute polioencephalitis superior, including those cases of paralysis in which the frontal, motor and occipital regions of the cortex are affected. (2) Acute polioencephalitis inferior, in which the nuclei of the cranial nerves are involved. (3) Acute poliomyelitis anterior, in which the gray matter of the anterior horns below the medulla is affected.

It is thought that the cord and brain may be affected at the same time, thus constituting a polioencephalomyelitis. Aldrich says that there is occasionally a disseminated encephalomyelitis complicating smallpox.

Two cases have recently come under my observation and constitute the subject of this clinical report.

CASE 1. E. V., a female child, aged five years, came under my observation July 31, 1905. She was born under normal circumstances; was breast-fed, progressed favorably during her infancy and never had any severe illness. The mother had taken the family away for a visit in Ohio. On July 25 the child fell ill with a severe headache. The mother thought the child was feverish. The pain in the head, which at first was slight, became more and more severe. During the first night of the illness the mother was of the opinion that the headache was intense. The child cried piteously, the mother carried her in her arms all night in an endeavor to quiet her. On the following day there was less restlessness and she did not speak to those around her. During the night of the second day the mother states that the child's head was thrown back and the arms were stiffened at frequent intervals. It was noticed that these rigidities of the neck and extremities seemed painful to the child. On the next day, Thursday, she became still more quiet, although there were paroxysms of pain during which she cried out loud. The father, who had come to take charge of her, was alarmed by the condition and concluded to bring her to Chicago, arriving July 31. The child was at once taken to the hospital.

Status Praesens. The child was semi-conscious; too stuporous to speak or take notice of anything. Temperature was 102.6° F.; pulse

138; respirations 30. Examination of the skull and scalp was negative. The pupils were equal and reacted both to light and distance; there was no peresis of the lids; a slight nystagmus, but no strabismus, was noted. The mouth and pharynx were negative. There was slight facial asymmetry due to paresis of the right side. The examination of the heart and lungs proved negative. The muscles of the upper extremities were tense and somewhat retracted. Palpation of the abdomen elicited some rigidity of the muscles, with a slight retraction of the abdominal wall. The tendon reflexes were all increased, yet more markedly on the right side. The Babinski toe sign was present, also more markedly on the right side. The Kernig sign was not present. The child was having involuntary evacuations from the bowel and bladder. The examination of the urine was negative. Blood examination showed a moderate leukocytosis.

There was not much change in her condition for a number of days after her admission to the hospital. At times, particularly at night, she was slightly restless, though for the most part she lay in a stupor. She took a moderate amount of food. There were occasional twitchings in the right arm and leg, though voluntary movements were not noted. The pulse was sometimes irregular. The temperature varied from 90° F. in the morning to 103° F. in the evening, and followed no regular type. After she had been in the hospital about a week, the temperature showed a tendency to fall, and on the ninth day was practically normal. At this time she began to cry out, but did not appear brighter. On August 14 (twentieth day), however, she seemed to recognize her baby brother. On August 18 (twenty-fourth day) her mind was clearer and she took considerable food. She cried out at times, seemed to recognize those who entered the room, but did not speak. On August 19 (twenty-fifth day), for the first time, she moved her left leg, but neither her head nor hands. She recognized her mother by signs, but did not speak. On August 22 (twenty-eighth day) she gave evidence of general improvement. She smiled and nodded to those who came into her room. Her pulse was slow, but of good quality. On August 23 (twenty-ninth day) movement was noted in her left foot and leg. She seemed greatly pleased about this and laughed out loud. On August 26 (thirty-first day) she was removed from the hospital to her home. She seemed very

happy; moved her left arm and leg, relished her food, but was still unable to speak. On Augst 31 (thirty-sixth day), for the first time, movement appeared in the fingers of her right hand. During this interval she used her left arm and leg with ease; participated somewhat with her brother and sister in their play, and they endeavored to teach her the deaf and dumb language, in which they they partly succeeded. She enjoyed this idea, and made finger signs in return, thereby indicating her wants. The mother states that on September 5 (forty-first day) she tried to talk, but describes the attempt made as pitiful. A few days later she ventured the remark, "take me." It was a very great effort. Improvement was slow. The use of her left arm and leg returned only after a protracted time. The paresis of the right side of the face improved only slightly. Her speech improved gradually, though even now she talks with some difficulty. She hesitates and stammers, and her speaking vocabulary is not large. The upper extremity of the right side is used with some difficulty. There is some contracture in the hands and in fingers. The elbow joints are movable. She is awkward in the use of the arm and hand. The patellar reflex of the right side is more active than the left. Ankle clonus is present. There is no considerable atrophy of the right leg or arm; the foot hangs in equinovarus position; the gait is decidedly of a hemiplegic type. She is irritable and extremely shy in the presence of strangers. Sensation everywhere is normal.

The points in this case may be summed up briefly as follows: A previously healthy child was taken suddenly ill with headache, fever, and increasing unconscious, a condition which continued for about ten days. When she awoke from the stupor she was found to be suffering from a generalized paralysis. The use of the left side recovered itself in a very few days. She was and is now suffering from a complete right-sided hemiplegia. Her intelligence does not seem to have suffered to any marked degree. As I saw the child on the first day, it impressed me much as would a case of tuberculous meningitis, and I am free to confess that this impression was retained throughout the first week of the illness. Respecting the wishes of the father, I did not make a lumbar puncture. It was only when the child aroused somewhat from the stupor that we began to suspect the true nature of the disease, which suspicion grew to conviction with the appearance of the hemiplegia.

CASE 2. Male child, five years of age; was without serious illness until the present attack.

Family History. The maternal grandfather died at the age of sixty-six from heat prostration. The maternal grandmother met with an accidental death at the age of thirty-one. The paternal grandparents lived to be very old. The little patient's father lost two sisters from tuberculosis. The father himself has always been well. The mother is a very large, robust woman. She says she never had any serious illness, although all her life she lacked in endurance.

The boy took sick on September 1, 1905. At the dinner table he did not seem quite himself. He appeared exhausted; his face became pale; he was listless, and had to be carried to bed. Although this was quite unusual, nevertheless the mother attributed it to hard play. The next morning he vomited several times, but did not create the impression of being seriously ill. The pulse was 120 and the temperature 101° F. He was drowsy, though he could be readily aroused. The mother thought he did not act differently from many another child suffering from fever. On this day the parents were invited to a friend's farm in the country. Notwithstanding the little fellow's indisposition, they took him along. He continued to be drowsy, refused food for the most part, and vomited occasionally. This was the third day of his illness. In the evening the boy did not seem any better and the parents returned with him to the city. He acted excessively nervous, was very irritable and fretful, and it was noticed by the mother that the left side of the face was slightly drawn and a slight tremor appeared on the right hand. His condition was not considered worse on the night of arrival home, since he slept nearly all night. On Monday at five P.M. he seemed decidedly worse. His temperature was 104° F.; his pulse was very rapid. He lay in bed in dorsal position, unconscious, though he gave an occasional cry. There were involuntary passages from the bowels and the bladder. On Tuesday (fifth day) he was unable to speak and was stuporous. He vomited occasionally, and threw himself about. At this time it was observed that he had a paresis on the left side of the face, and it was suspected that the right arm and leg were paralyzed. He lay in this condition of stupor until Thursday (seventh day), when he awakened for an hour. On Friday he became brighter, taking notice of some figures on the bedspread and calling attention

to same. From this day on he was without fever. His recovery was gradual. He shortly regained his speech, and in three weeks more was able to walk. The mother called attention to the fact that, although improved and up and about, he nevertheless remained extremely nervous. He became greatly excited in the presence of a company of people, or when taken downtown among large crowds. The slightest physical effort seemed to prostrate him.

I saw him for the first time on the fourth day of his illness, and noted a well-developed, well-nourished boy in a state of unconsciousness and with a considerable fever, varying from 102° to 104° F. The examination of the head and scalp was negative. Inspection of the ears by a specialist showed them to be normal. The pupils were regular, reacted readily to light and accommodation. The examination of the eye grounds proved negative. The left half of the face was drawn slightly. The tendon reflexes of the arm and leg on the right side were somewhat more brisk than those on the left. The urine was excessively acid and showed slight traces of albumin.

In the course of the disease the little fellow showed progressive improvement. There is now a very evident paralysis of the left half of the face. If he smiles or attempts to whistle, or even to speak, left facial paresis is unmistakable. The hand and arm on the right side have recovered to a very considerable degree. There is a slight flexion of the fingers, though he uses his hand with great facility. There is some limp when he walks, though there seems to be very little spasticity of the right leg. He sometimes complains of a pain in the right foot and hand, probably the so-called post-hemiplegic pain. He is a bright little fellow, quick and nervous in his actions, talks about almost every subject in a very intelligent way. He makes the impression of being mentally normal.

This case presented such difficulties in diagnosis which confront one in the incipient stages of this disease. During the first forty-eight hours one would have thought of some acute infectious process; for example, an obscure pneumonia or almost any infectious disease in process of development.

The case is of additional interest in that it shows undoubted evidence of a crossed paralysis with the lesion located in the pons, and belonging to that variety already referred to as polioencephalitis inferior.

Etiology. The causes of acute non-suppurative encephalitis may be summed up briefly in the words of infection and intoxication. Acute alcoholism possibly plays a rôle in adult and older children. In one of Wernicke's cases, poisoning with sulphuric acid was suspected. In other cases, nicotine has been thought of as a factor. The infective source is the most frequent of all in the encephalitis of children. It is well-known that an encephalitis may develop during the course of cerebrospinal meningitis. In nearly a third of all the cases of hemiplegia in young life, it has followed one of the acute infectious diseases, occurring either at the height or the defervescence of the disease (Freud). There is probably no infectious disease known which has not been reported at one time or another as having been followed by cerebral hemiplegia. Measles and scarlet fever, according to Freud, head the list. Next in order come smallpox, German measles, whooping cough, diphtheria, croup, follicular tonsillitis, morbus maculosis, dysentery, pneumonia, typhoid fever, mumps, intermittent fever, chorea with endocarditis; even vaccination is said to have caused hemiplegia in several cases. Perhaps the best known and the best studied of all the various infections producing encephalitis is influenza. The question is not altogether settled whether the influenza bacillus or its toxin produces the cerebral inflammation.

Pfuhl succeeded in finding influenza bacilli in the central nervous system of cases dying of a severe nervous form of influenza. Nauwerck succeeded in finding the Pfeiffer bacillus in a case of influenzal encephalitis in the brain and in the ventricles. Cantani has injected cultures of influenza bacillus beneath the dura of rabbits, and succeeded in producing meningitis and encephalitis. He found, too, that the same result could be produced by the injection of dead cultures as well as living cultures. The inference, therefore, is that encephalitis is due to the action of a toxin produced by the bacilli on the brain substance. There are a large number of cases in which encephalitis occurs as a primary infection; that is, where no relation can be traced to antecedent disease. In the two cases which I have cited evidence of any pre-existing infectious disease is absolutely lacking.

All authors mention trauma, such as a blow on the head or a fall, as having some direct remote relation to the disease. The developmental condition of the brain, Heubner thinks, has an in-

fluence on the causation of the disease. He finds that it is much more frequent during the first and third years of life, though it does occur at almost any age during childhood. In some of the cases, syphilis is a predisposing, if not an exciting, cause by giving rise to an endarteritis, or some other form of syphilitic degeneration; such an area might also become secondarily infected. An ulcerative endocarditis may cause an embolic process infectious in character.

Pathological Anatomy and Histology. Any portion of the brain may be affected, though, as it has already been stated, the cortex (superior encephalitis), the basal ganglia and the region of the medulla (inferior encephalitis) are selected areas. The cerebellum is seldom affected, although Batten recently reports a case typical as to its clinical findings and verified by autopsy. The disease is usually focal in character, though the foci are multiple and disseminated. The most striking point in examining an area of inflammation is the change of color apparent in the gray substance. It is grayish-red or violet or brownish-red, or the white substance is streaked with red. Sometimes there is a uniform discoloration or the brain substance appears streaked or spotted. On section of the brain there appeared red or yellow points which have been compared to flea bites by older authors and described as being surrounded by zones of swelling and softening. When the lesion is in the cortex the neighboring pia is usually injected and may be adherent.

Brooks (*Med. News*, Aug. 9, 1903), in a report of a case of non-suppurative encephalitis, summarizes the pathological findings:

"(1) Cerebrospinal meningitis, probably secondary to cerebritis, and of the 'cellular' type as described by Delafield and Pruden.

"(2) General non-septic cerebritis affecting all parts of the cerebrum, but most marked in the cortex and particularly so in that of the motor areas. The disease is characterized pathologically by perivascular round-cell infiltration, dilation of the lymph spaces and by areas of neuroglial proliferation. The changes are further identified as inflammatory by the presence of occasional plasma cells.

"(3) Degeneration of many of the ganglion cells of the cortex. From the character of the lesions of these cells it is inferred that in most cases the changes have been of recent origin. Possibly some are postmortem alterations.

"(4) Degeneration of many of the fibres arising from the large pyramidal cells of the cortex, most marked in those derived from the motor areas.

"(5) Diffuse degeneration affecting many of the fibres passing through both internal capsules.

"(6) Inflammation of the tissues of the cerebellum, of much less marked degree than in the cerebrum, but apparently of the same character and accompanied by similar, but much less extreme, changes in the cells and fibres.

"(7) Degeneration of many of the descending fibres of the pons and medulla.

"(8) Degeneration of the chief descending tracts of the spinal cord with degeneration of occasional fibres in ascending tracts, possibly aberrant descending fibres.

"(9) Slight, probably secondary cytoplasmic degeneration of the ganglion cells of the anterior horns of the spinal cord."

The results of acute encephalitis may terminate in local necrosis or formation of scar tissue. Glia cells are proliferated and connective tissue formed. This results in a local induration, referred to by the older writers as brain sclerosis. The process may be very extensive and lead to atrophy of a part or even an entire cerebral hemisphere. In other organs, lesions are sometimes found as the result of the general infection. The spleen is at times enlarged; hemorrhages occur into intestines and mesentery, while a parenchymatous degeneration of myocardium and acute nephritis may be present.

Symptomatology. Strumpell, in his "Lehrbü fur Specielle Pathologie und Therapie, 1893," speaks of acute encephalitis as occurring in children between one and four. The disease is marked by sudden onset, with feeling of illness and fever. Shortly nausea and vomiting, or general cerebral disturbance in the form of coma and convulsions, may occur. This condition may last one or two days, or it may last one to three weeks. The children may recover from the disease gradually, but paralysis in some form will remain. After the paralysis has existed a while, examination usually shows that both extremities of one side are affected, the arm more than the leg. There are no sensory disturbances. The growth is to a certain extent retarded. The muscles are somewhat atrophied. There is no reaction of degeneration, but almost always more or less muscular contraction. Variations from this course some-

times occur. Children occasionally die suddenly before the diagnosis can be positively made. Chronic forms sometimes occur. In these cases, the initial symptoms may last one or two months. Convulsions occur frequently, resulting from the new inflammatory areas. Strumpell believes this disease is analogous to acute poliomyelitis; the initial symptoms are so similar that in a given case it might be difficult to decide whether a cerebral or spinal paralysis would ensue. In another group of cases, which belongs more particularly to the inferior polioencephalitis group, the acute infectious diseases very often precede the onset of the encephalitis. One of Leyden's cases of this type is of interest. A fifteen-year-old boy fell suddenly ill with headache, nausea and dizziness, and on the third day the symptoms were augmented by fever, vomiting, difficulty in swallowing; the symptoms progressed, and on the sixth day of his illness, in addition to the headache and dizziness, he developed rigidity of the neck, ataxia, paralysis of both facial nerves, paralysis of the hypoglossal, of the soft palate and vocal cords. He also had a mild fever. His pulse was slow; there was no involvement of the eye muscles at first; later on he showed paralysis of the abducens. He died on the eleventh day of his sickness, and the autopsy showed a pneumonia with an encephalitis in the region of the medulla.

Another case of encephalitis located in the pons, reported by Oppenheim, was that of a twelve-year-old girl, who suffered from a swollen face, with pain on the left side. She also suffered from headache. Very soon she became mentally dull. There was no fever; there were no changes in the eye grounds. Some time later, however, the left facial nerve became entirely paralyzed, with a hemiparesis and incoördination of both arms, though most marked in the left arm. The tendon reflexes became increased; the soft palate was paretic; articulation was difficult. All of these symptoms pointed to a focal lesion involving the pons in the region of the left facial nerve, and extending so as to involve the sensory and left pyramidal tracts.

In the majority of cases the disease begins in the midst of perfect health, like acute infection, and in the manner already referred to. Convulsions may occur; they may be of the Jacksonian type, or they may be general. The vomiting may be persistent,

and the child remain in a febrile, stuporous, or comatose condition for several days. The temperature is variable; the coma rarely complete. At first sight, one is inclined to think of meningitis or perhaps some other acute infectious disease which is in process of development, with decided nervous symptoms; but in a few days the fever declines; the child becomes more quiet, and thus, on the fourth or fifth or perhaps the tenth day of the disease, the paralysis becomes evident. There may be an arm involved, a complete hemiplegia, or a crossed paralysis due to a lesion in the pons, as has already been referred to.

At the very outset the reflexes may be diminished, and a generalized paralysis of all of the extremities seems to be present. In several days, however, the unaffected extremities begin to regain their motor function, and later on the child begins to move to some extent the affected arm or leg. At this time the reflexes on the involved side are usually increased, and the Babinski toe sign becomes manifest.

In addition to the symptoms already enumerated on the part of the nervous system may be mentioned the nutrition of the skin, which is affected. It is likely to appear blue on account of capillary and venous stasis in the hand and foot of the affected side. Such an extremity is cyanotic; sometimes slightly edematous; and not infrequently cooler than the limb of the other side. The skin is dry; the sweat glands less active on the affected side. Very often, and particularly in the milder cases, the intellect of the child remains practically unimpaired. At other times, where the lesion is extensive, more or less permanent mental deficiency supervenes, even to the production of idiocy. Such a disturbance of motor speech may persist in varying degree. In many cases epileptic convulsions develop from which recovery is impossible.

Schultze first called attention to the fact that deaf-mutism may result from acute encephalitis. He cites the following case: A two and one-half year old child, healthy, received a blow on the head. The same evening it cried for several hours, and on the following night had convulsions with slight fever. For two days thereafter it was stupid, restless and refused food. On the fourth day, showed some improvement. Ten days after the beginning of the disease it was found that the child was deaf; also that it had

slight strabismus; no other paralysis existed. The deafness continued, although the middle ear was normal.

In some of the milder cases, the paralytic symptoms may entirely disappear, and Medin reports a recovery without permanent paralysis. Comby also reports a case in a seven-year-old girl cured without a trace of paralysis.

Complete recoveries have been reported after slight attacks, usually slight paralysis remaining.

The terminal of the cases may be summarized as follows:

(1) A small proportion of the cases do not survive, death occurring in the second or third week or as early as the first day.

(2) If the encephalitis occurs during acute infectious disease, death may result from cerebral conditions or from the original disease.

(3) Some cases improve within a few days, without any signs of disease after six or eight weeks. There is always a liability to hemiparesis of one side of the body or to epilepsy.

(4) The majority of cases with initial flaccidity give rise later to the spastic type of hemiplegia.

The diagnosis during the acute stage is nearly always difficult. One is inclined to think of an acute infectious disease, on the one hand, or a meningitis on the other. The diagnosis may be confused with that of a tuberculous meningitis. Spinal puncture in these cases is of but little assistance. If hemiplegia or cranial nerve paralysis occurs, followed by returning consciousness, the diagnosis is rendered comparatively easy. In short, if in the midst of absolute health, or in connection with an acute febrile disease, the child during the first years of life is seized with recurring convulsions, or vomiting, if a hemiplegia results, or if later psychic disturbances, contractures, hemichorea, epilepsy or idiocy develop, the diagnosis of encephalitis can be made with reasonable certainty.

DEPARTMENT OF ABSTRACTS

Breese, B. B. and Gray, H.: Antistreptolysin Titer as an Aid in the Diagnosis of Rheumatic Fever. (New York State Journal of Medicine, 51:389, Feb. 1, 1951).

The antistreptolysin titer of serum of patients suspected of rheumatic fever is a diagnostic aid of value. In the authors' experience 95 per cent of cases of definite rheumatic fever had titers of 250 or above, whereas 60 per cent of streptococcal cases, 42 per cent of inactive rheumatics and 24 per cent of nonrheumatics had titers as high. A repeated low titer is fairly good evidence that a patient does not have active primary rheumatic fever. However, a high titer does not necessarily indicate rheumatic fever but merely that the patient has had a beta hemolytic streptococcal infection in the past. The authors attribute the large percentage of high titers in their series of rheumatic fevers to the following facts: (1) All cases were moderately severe. (2) Almost all cases had repeated blood samples. (3) Almost all cases had initial blood samples taken within two months of onset.

Michael A. Brescia, M.D.

Kyle, L. H. and Knop, C. Q.: Simulation of Cardiac Disease by Adrenocortical Failure in Infants. (New England Journal of Medicine, 243:681, Nov. 2, 1950).

Three cases of adrenocortical failure in infants suffering from the type of the adrenogenital syndrome associated with congenital adrenal hyperplasia are reported. Although newborn females with this disease invariably have obvious genital abnormalities, male infants ordinarily demonstrate no gross disorder of sexual development. Adrenal failure usually occurs in only a portion of the affected children, and there is some indication that the male sex is more prone to show such a complication. In two out of three cases reported the presenting problem was a marked disturbance in cardiac rate and rhythm that suggested the existence of congenital heart disease. Elevation of serum potassium is one of the more striking features of adrenal failure and appears to be more pronounced in children. The studies in one of the cases suggest that in children the V leads not only are a good index of elevation of serum potas-

sium but also may demonstrate abnormalities in the presence of even a moderate rise in the potassium level. The syndrome of adrenal hyperplasia with adrenocortical failure should be seriously considered in any acutely ill infant who shows genital abnormalities. Although diagnosis during life is dependent on the demonstration of an increase in urinary 17-ketosteroid excretion, electrocardiogram changes indicative of hyperkaliemia may offer support in favor of a diagnosis of adrenocortical failure.

MICHAEL A. BRESCIA, M.D.

BROWN, E. E.: RAPID TRANSFORMATION OF CRETINS WITH LARGE DOSES OF THYROID. (Northwest Medicine, 50:22, Jan. 1951).

Two cretins, treated by many physicians with one-qaurter and one-half grain desiccated thyroid substance, made little mental and physical progress over a period of many months. When increased to a dose varying between two and four grains daily, gratifying transformations mentally and physically were noted in a short time. Proof is presented that large doses of thyroid enable the cretin to regain some of his lost growth, heretofore a constroversial point. Toxic symptoms, which should be differentiated from dangerous symptoms, may be produced by an optimal dose of thyroid. Toxic symptoms include rapid pulse, mildly elevated temperature, initial loss of weight, increased nervousness and frequent bowel movements. Dangerous symptoms are extreme restlessness, twitching, diarrhea or vomiting, continued loss of weight, very rapid pulse rate, high fever and syncope. The physician must take the responsibility of prescribing a large (optimal) dose of thyroid, if he can see the child at frequent intervals. To give less is to deprive the cretin of his only chance for full mental and physical development. AUTHOR'S SUMMARY.

COSSANDI, E. AND MAGGIORA, L.: FIRST REPORTS OF THE RESULTS OF USING SODIUM PAS INTRATHECALLY IN THE TREATMENT OF TUBERCULOUS MENINGITIS IN INFANTS. (Il Lattante, 21:507, Aug. 1950).

The authors report on the treatment of five cases of tuberculous meningitis in infants ranging in ages from 8 months to 23 months.

Of these five cases, four are apparently completely cured and one died. The treatment consists of streptomycin intramuscularly and intrathecally in 50 mg. doses. This intrathecal therapy is alternated with sodium PAS in doses of 20 mg. per Kgm. of body weight. Sodium PAS is also given orally. The authors feel that streptomycin and sodium PAS work synergistically and are more effective in curing tuberculous meningitis.

MICHAEL A. BRESCIA, M.D.

DEAN, H. T.; ARNOLD, F. A.; JAY, P. AND KNUTSON, J. W.: STUDIES ON MASS CONTROL OF DENTAL CARIES THROUGH FLUORIDATION OF THE PUBLIC WATER SUPPLY. (Public Health Reports, 65:1403, Oct. 27, 1950).

Fluoridation of the Grand Rapids public water supply began in January 1945. Analysis of the 1949 dental examinations at Grand Rapids shows a reduced amount of dental caries experience when compared with the prefluoridation rates of 1944-45. The findings indicate that the reduction is most pronounced in the younger age groups whose dentition was largely calcified following the addition of one part per million of fluoride to the previously fluoride-free public water supply. Sufficient time has not elapsed to evaluate water fluoridation in the older age groups.

AUTHORS' SUMMARY.

FAMILIAL HEMOCHROMATOSIS. (Giornale di Clinica Medica, Parma, 30, 857, Nov. 1949). Capretti and Telo report two brothers and two sisters of a family of normal parents and of six children. The 4 patients presented a uniform bronze pigmentation of the skin, of the type of hemochromatosis and hepatosplenomegaly. There was no diabetes or liver cirrhosis. The genitalia were normal except for local hyperpigmentation. The duration of the disease varied from two to 10 years. The patients complained of fatigue, loss of muscle power and asthenia. One of the sisters, a multipara, exhibited symptoms of struma ovarii and adrenal dysfunction. Hemochromatosis is an endocrine dysfunction originating in an embryonal lability of one or more endocrine glands. In late adult life, and rarely in youth, the predisposed tissues become the seat of a pigmented sclerosis, with infiltration of the skin with melanin.—*Journal A.M.A.*

ITEMS

ABDOMINAL SIGMOID-RECTUM RESECTION IN HIRSCHSPRUNG'S DISEASE. (Ugeskrift for Laeger, Copenhagen, 112: 216, Feb. 16, 1950). Seven children with Hirschsprung's megacolon, aged 3 months to 5 years, were operated on in the children's division of the Rikshospital. The triad of distended abdomen, constipation and intermittent vomiting together with the roentgenologic signs of a dilated colon and normal rectum fulfilled the diagnostic criteria. The clinical symptoms may appear before roentgenologic signs, as in the fourth case, in which clinical symptoms were present from birth but roentgenologic symptoms were not demonstrable for about six weeks. In 5 cases primary resection was performed; in 2 a preliminary colostomy was done. The postoperative course was uneventful in all cases. The author now limits colostomy to cases with compulsory indications, as shrinking of the distal end of the colon after colostomy makes resection more difficult and there may also be the danger of stenosis at the point of resection (Swenson). —*Journal A.M.A.*

EPIDEMIC MUMPS. (Revista Clinica de Sao Paulo, Sao Paulo, 26: 1, Jan.-Feb. 1950). Monteiro de Barros and Pupo Nogueira call attention to the fact that epidemic mumps is a general contagious disease with or without involvement of the parotid glands. It frequently causes orchitis, oophoritis, pancreatitis, meningoencephalitis, myocarditis and glomerulonephritis. They report 10 cases of mumps. There were 3 patients with mups orchitis complictaing bilateral parotitis. There were also 3 patients with pancreatitis, 2 men and a 12 year old girl developing on the fourth or fifth day, acute bilateral mumps parotitis. This was followed by bilateral orchitis in the men and by bilateral oophoritis in the girl. The symptoms were headache, fever, epigastric pain and gastric disorders. There were 2 patients with mumps meningoencephalitis and 2 patients with glomerulonephritis. Mumps virus has a selective affinity for the parotid glands. The localization of mumps virus in other structures depends on diminished resistance of a given structure when the virus invades the organism.—*Journal A.M.A.*

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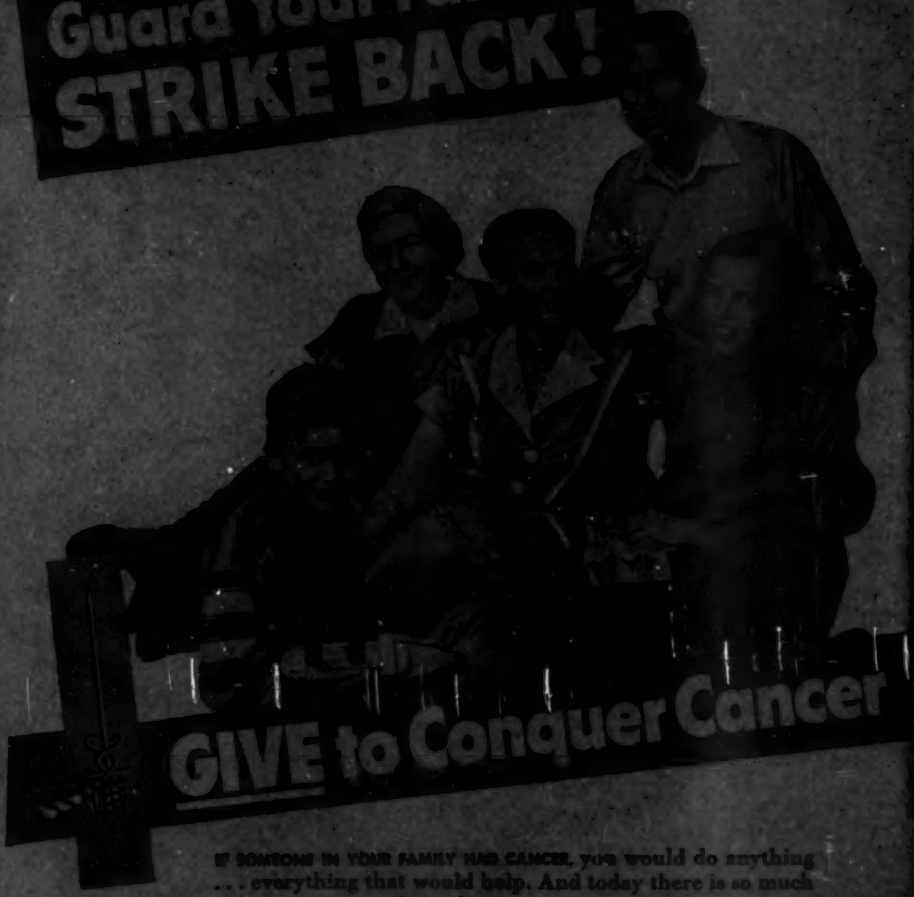

GIVE to Conquer Cancer

IF SOMEONE IN YOUR FAMILY HAD CANCER, you would do anything . . . everything that would help. And today there is so much that you can do to help.

Doctors can now cure half of those who develop cancer if the disease is diagnosed in its early stages. Yet in 1950 some 216,000 families lost a father, a mother or a child to cancer.

We need more research, more life-saving education, more training for scientists and physicians, more equipment, more services for those already stricken with the disease. We all must help. Any contribution is welcome, but the fight against this major threat deserves major support: dollars—tens—twenties—hundreds of dollars. Will *you* help?

AMERICAN CANCER SOCIETY

in acute follicular tonsillitis...

"prompt clinical response" with Terramycin

CASE	DIAGNOSIS	CULTURE	ORGANISM	DOSE (GM.)	NUMBER OF DAYS TREATED	RESULT
29	Acute follicular tonsillitis	throat	Streptococcus pyogenes	4	3	Prompt clinical response. No fever after 24 hours of treatment

Case report taken from Harrell, W. E., Beaman, F. R., Walman, W. L., and Bartholomew, L. A.: Proc. Staff Meet., Mayo Clin. 25:183 (Apr. 22) 1950.

CRYSTALLINE

Terramycin

HYDROCHLORIDE

Dosage: On the basis of findings obtained in over 150 leading medical research centers, 2 Gm. daily by mouth in divided doses q. 6 h. is suggested for most acute infections. In severe infections, a high initial dose (1 Gm.) or higher daily doses (3 to 6 Gm.) should be used. Treatment should be continued for at least 48 hours after the temperature is normal and acute symptoms subside.

Supplied. 250 mg. capsules, bottles of 16 and 100;
100 mg. capsules, bottles of 25 and 100;
50 mg. capsules, bottles of 25 and 100.

Antibiotic Division Pfizer CHAS. PFIZER & CO., INC., *Brooklyn 6, N. Y.*